

## CLAIMS:

1. A portable communication device comprising:  
an earpiece speaker,  
a loudspeaker,  
5 a circuit coupled to the earpiece speaker, and the loudspeaker, said circuit comprising:  
a signal source for generating a signal for driving the loudspeaker,  
wherein said signal source is coupled to the loudspeaker; and  
a cancellation filter, wherein said signal source is further coupled to the  
10 earpiece speaker through a cancellation filter.
2. The portable communication device according to claim 1 further comprising:  
a common acoustic resonator coupled to the earpiece speaker, and to the  
loudspeaker.
- 15 3. The portable communication device according to claim 1 wherein:  
the cancellation filter comprises a digital filter.
4. The portable communication device according to claim 3 wherein:  
20 the circuit comprises, a processor;  
the signal source comprises a software implemented signal source; and  
the cancellation filter comprises a software implemented digital filter.
5. A portable communication device comprising:  
25 an earpiece speaker;  
a loudspeaker;  
an acoustic resonator acoustically coupled to the earpiece speaker and the  
loudspeaker;  
a first amplifier drivingly coupled to the earpiece speaker;  
30 a second amplifier drivingly coupled to the loudspeaker;  
a first digital to analog converter drivingly coupled to the first amplifier;

a second digital to analog converter drivingly coupled to the second amplifier;  
a processor coupled to the first digital to analog converter, and coupled to the  
second digital to analog converter wherein the processor is programmed to:

- 5           apply a loudspeaker drive signal to the second digital to analog converter;  
          apply a cancellation filter to the drive signal to obtain a cancellation filtered  
drive signal; and  
          apply the cancellation filtered drive signal to the first analog to digital  
converter.

- 10       6.     The portable communication device according to claim 5 wherein:  
          in applying the cancellation filter to the drive signal, the processor is  
programmed to apply a finite impulse response filter to the drive signal.

- 15       7.     The portable communication device according to claim 5 wherein:  
          the acoustic resonator comprises an opening for coupling acoustic energy from  
the earpiece speaker to a user's ear.

- 20       8.     A method of operating a portable communication device, the method  
comprising:  
          applying a drive signal to a loudspeaker of the portable communication  
device:  
          cancellation filtering the drive signal with a cancellation filter to obtain a  
cancellation filtered drive signal;  
          driving an earpiece speaker of the portable communication device with the  
25       cancellation filtered drive signal;  
          whereby, a level of sound emanating from the loudspeaker, and coupled to a  
user's ear is reduced.

- 30       9.     The method according to claim 8 further comprising:  
          prior to applying the drive signal to the loudspeaker, delaying the drive signal.

10. The method according to claim 8 wherein:

5 cancellation filtering comprises, filtering with a cancellation filter that is characterized by a first frequency response that, when compounded with a second frequency response that characterizes electrical to acoustic transducing response of the earpiece speaker, substantially negates a third frequency response that characterizes electrical to acoustic transducing response of the loudspeaker as measured with an ear simulator.

11. The method according to claim 10 wherein:

10 cancellation filtering comprises digitally filtering with a finite impulse response filter.